

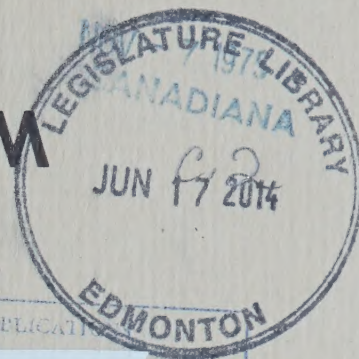
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# CALGARY DAIRY FARM

## BUSINESS SUMMARY

1970



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REPORT ON  
23 SAMPLE DAIRY FARMS

PRODUCTION ECONOMICS BRANCH  
ECONOMICS DIVISION

ALBERTA  
DEPARTMENT OF AGRICULTURE

*Marketing Sector*

MINISTER  
HUGH HORNER

DEPUTY MINISTER  
DR. G.R. PURNELL



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## BUSINESS SUMMARY

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## REPORT ON

## 23 SAMPLE DAIRY FARMS

K.D. Porter

## PRODUCTION ECONOMICS BRANCH


## ECONOMICS DIVISION

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## INTRODUCTION

In 1970, 23 fluid milk producers out of a total of 261 in the Calgary-Red Deer milkshed provided their records of business for analysis. The farms represented a cross section of the producers based on quota size.

This report contains a summary and analysis of business activities on a group basis in conformation with previous reports. It is intended to supplement computer printouts in the hands of the dairymen with a general comparative analysis, and to provide information to the dairy industry, the Milk Control Board and to Government personnel in the field of farm management.

## ACKNOWLEDGEMENTS

Acknowledgement is due to the participating dairymen for their records of business and for their very considerable efforts in adapting their records to the new Alberta Farm Account Book. Thanks are also due to the Milk Control Board for their assistance, and to the other Branches of the Economics Division who helped significantly in gathering the information.





## DEFINITION OF TERMS

Total Farm - This term includes all enterprises in farm business, and in this report it refers to the income and expenses associated with the total farm operation.

Operating Revenue - Includes cash receipts and the adjustment of crop and livestock inventories less livestock purchased.

Operating Expenses - Are cash expenses plus depreciation, plus an allowance for unpaid family labour exclusive of the operator.

Net Farm Income - Is the difference between Operating Revenue and Operating Expense prior to deducting Capital interest expense and an interest return up to a combined value of 7% of the current equity in the farm.

Labour Income - Is the residual to the operator after deducting the interest on investment.

Labour Earnings - Is the addition of labour income and the value of home-consumed produce, and is the amount forthcoming to the farm operator for his labour and management for the year.

Dairy Enterprise - The Dairy Enterprise, for the purpose of business analysis, is an operating unit in itself which may draw upon other enterprises of the farm for such resources as feed and labour.

Herd Credit - Is the increase or decrease in the value of the dairy herd through sales, purchases, births, natural growth and dairy livestock losses during the year.

Milk Costs Per Hundredweight - This refers to the analysis of costs of production of milk sold to the fluid milk distributing plants.

Return to Management and Profit - Or Return to the Operator's Management and Risk, is the dollar value remaining to the operator after including his labour and interest at 7% on capital as costs of operation.

Value of Production From Dairy - Is the receipts from the sale and personal use of dairy products plus the value of inventory change in feed and dairy cattle less purchase of dairy livestock.

## DEFINITION OF TERMS

Total Variable Costs - Are short-term costs which vary relative to output.

Fixed Costs - Consist of depreciation, interest on investment and such costs as utilities, insurance and taxes.

Total Production Cost - Is the sum of all variable costs, labour and fixed costs.

Unpaid Labour - Consists of the operator's labour and any unpaid labour contributed by the family.

Capital Turnover - Is the number of years required for the value of production or operating revenue to equal the average investment for the year.



## OUTLINE OF THE STUDY

The dairy study deals with the economics of fluid milk production at the producer level in three general Alberta areas--Edmonton, Calgary and Lethbridge. A 10.5% sample of the 724 Alberta shippers submitted business information for the calendar year of 1970. In this year, the Alberta Farm Account Book was introduced for general use, the dairy farmers giving it the first trial. Assistance was provided in entering data so as to best facilitate computerization. Farmers' records from these books accounted for most of the data for analysis.

### Objectives

The purpose of the study is to provide a continuing account of the economic conditions in the production of fluid milk in Alberta for the Milk Control Board and the milk industry as a whole, and to provide the participating dairy farmers with personal business analyses for management purposes.

### Characteristics of the Study

The study was designed to be as representative as possible through selection by area and by quota size, the dairy enterprise being the main source of income on all farms. Crop enterprises are carried on in nearly all the dairy farms and certain dairy farmers have beef enterprises besides. The Alberta Farm Account Book was constructed to accommodate all such enterprises and, in the future, it is expected that analyses of each may be requested by farmers.

### Report Procedure

Farms were assembled according to their market areas and separate area reports have been made. Basic tables on Income and Expense respecting the Total Farm and Dairy Enterprise were first constructed. Management levels were determined, followed by auxiliary tables of feed and labour use. A development of management factors and their effect on the dairy enterprise was added. Comparative tables for farms of low, medium and high productivity were constructed and a consolidated statement made for all Alberta dairy enterprises.

## FARM INCOME AND EXPENSES

Table 1 shows the comparative Income Statement for the Calgary dairy farms on study during 1968-69 and 1970. Group averages on a per farm basis are used to indicate the outcome of the year's business activities. The total farm includes all enterprises that are carried on.

Receipts - The largest cash receipt in 1970 arose from the sale of milk (\$32,018.00), followed by dairy cattle sales and crop sales. The revenue from the first two items amounted to 91% of the total cash receipts. Other livestock sales were much lower than in 1968-69. Crop sales contributed 6% and miscellaneous receipts 2%. Total cash receipts of \$41,083.00 in 1970 were \$2,402.00 higher than in the previous year.

Inventory Change - Smaller crop and livestock inventory increases occurred in 1970. Livestock purchases, which were mainly dairy stock, exceeded the positive inventory items to produce a net negative inventory change of \$750.00. Thus Operating Revenue was reduced by this amount but, at \$40,333.00, remained above 1968-69.

Expenses - Feed purchases were less in 1970, but in all other categories except auto expenses, cash expenses were higher than in 1968-69. Because of these various increases the Cash Operating Payments of 1970 exceeded those of 1968-69 by \$1,462.00. However this difference was eliminated by lower depreciation costs, and Total Operating Expenses for both years became almost identical. Thus, the higher level of Net Farm Income in 1970 was almost entirely due to the increase in Operating Revenue.

Labour Earnings - Some increase in the average value of capital assets took place in 1970. This was partly due to new acquisitions and partly due to farmers' revisions of the market value of their farm investment. An arbitrary increase of 1% in the allowance for a return on investment in land and buildings was built into the analysis to reflect a reasonable return in that respect. The effect of this last item was the addition of \$1,152.00. An average amount of \$1,776.00 was paid by farmers in 1970 on capital loans and is included in the Interest on Capital figure in the table. The Operator's Labour Earnings, following the deduction of interest and the addition of perquisites, declined to \$1,700.00 in 1970.



Table 1

INCOME STATEMENT FOR THE TOTAL FARM OPERATION

January 1, 1970 to December 31, 1970

Calgary Whole Milk Farms	Group Average 1968-69	Group Average 1970	Your Farm		Group Average 1968-69	Group Average 1970	Your Farm
Number of farms <sup>a/</sup>	31	23			31	23	
<u>EXPENSES</u>	<u>b/</u>			<u>RECEIPTS</u>			
Feed bought for LS	\$ 5,538	\$ 3,510	\$	Gross milk sales	\$27,275	\$32,018	\$
Auto expenses	405	336		Dairy cattle sales	4,286	5,440	
Tractor expenses	785	1,067		Other livestock	3,210	372	
Truck expenses	701	706		Crop sales	3,333	2,415	
Gen. farm exp. (seed, fert., twine, etc.)	4,154	4,714		Misc. receipts	577	838	
Gen. dairy exp. (vet., milkhouse supplies, etc.)	1,127	3,079		<u>TOTAL CASH</u>			
Annual joint exp. (ins., phone, taxes, elec.)	1,971	2,207		RECEIPTS	38,681	41,083	
Wages paid with board	3,337	3,672		Change in Crop Inventory	1,599	446	
Hauling & fees off milk cheque	2,053	2,242		Change in LS Inventory	1,442	1,169	
<u>OPERATING PAYMENTS</u>	<u>20,071</u>	<u>21,533</u>		Deduct:			
Add:				LS Purchases	3,124	2,365	
Depreciation on bldgs. & equipment	6,265	4,997		Net Inventory Change	-83	-750	
Unpaid family labour (not incl. operator)	801	643					
<u>TOTAL OPERATING</u>				<u>OPERATING REVENUE</u>	<u>38,598</u>	<u>40,333</u>	
<u>EXPENSES</u>	<u>27,137</u>	<u>27,173</u>					
Net Farm Income	11,461	13,160					

The Net Farm Income for the groups of farms above represents the Average Net Income per farm and results from subtracting Total Operating Expenses from the Operating Revenue. The Net Farm Income is further modified by deducting interest on Capital investment at a rate of 7% and farm produce used on the farm (perquisites) to arrive at the returns from the Total Farm Business. In 1970, only the business portion of the farm home was capitalized in the farm business so the personal portion does not enter into perquisites. The final measure is known as the operator's LABOUR EARNINGS which is the return to the operator for his labour and management and is shown below.

Deduct:			
Int. on capital	\$ 9,652	\$11,545	\$
LABOUR INCOME	1,809	1,615	
Add: Perquisites	954	85	
<u>LABOUR EARNINGS</u>	<u>\$ 2,763</u>	<u>\$ 1,700</u>	<u>\$</u>

<sup>a/</sup> Previous year's figures included for comparison.

<sup>b/</sup> All figures have been rounded to the nearest dollar.

### CALGARY DAIRY ENTERPRISE ANALYSIS

Table 2 summarizes comparative receipts and expenses of the Calgary area farms for 1968-69 and 1970 in terms of group averages for the dairy enterprise only.<sup>1/</sup> Receipts included all sales of dairy products and the value of herd credit. In cases where dairy steers were customarily raised for sale they were considered as a beef enterprise and were excluded. The various expenses were assembled into four main categories. The value of the operator's labour was included in labour charges in order to be able to arrive at a residual return to management above all costs.

Receipts from the sale of milk in 1970 constituted 87% of total dairy receipts, which were up by \$5,444 over the previous year. The herd credit accounted for most of the additional value.

Costs rose in every category, amounting to \$34,245. They were composed of Feed - 38%, Labour - 18%, Overhead - 20% and Other Costs - 24%. The effect of higher receipts was therefore reduced and the net returns to management lowered to \$2,628 in comparison with \$4,985 for 1968-69.

#### Milk Costs Per Hundredweight

In this section of the table, receipts other than those obtained from the sale of milk to the whole milk plants were eliminated and costs were reduced by the amount of the herd credit so as to arrive at a net return per hundredweight of sales to plants.

On a hundredweight basis Overhead and Other Costs were up sharply. These contributed to a high gross cost of \$6.17, before the deduction of the herd credit resulted in a net cost of \$5.33. The price of \$5.76 per hundredweight relieved some of the effect of the higher cost in 1970, leaving a return of \$0.43 to management.

Depreciation of equipment and facilities and interest on investment increased \$0.23 and \$0.24 respectively per hundredweight. In Other Costs, Veterinary and Medical Expenses, Utilities and Supplies increased \$0.23 and \$0.24 respectively. These changes combined to lower the effective return to the operator's management.

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<sup>1/</sup> Consolidation of Edmonton, Calgary and Lethbridge--page 16.



Table 2

DAIRY ENTERPRISE COST ANALYSIS

January 1, 1970 to December 31, 1970

Calgary Whole Milk Farms	Group Average 1968-69	Group Average 1970	Your Farm
Number of farms	31	23	
<u>Dairy Receipts Per Farm</u>			
Value of milk sales per farm	\$27,275	\$32,018	\$
Value of milk used in house per farm	276	106	
Value of credits to dairy herd per farm <sup>a/</sup>	3,878	4,662	
Value of miscellaneous dairy income		87	
Total Receipts	31,429	36,873	
<u>Dairy Costs Per Farm</u>			
Feed cost at <sup>b/</sup> farm market value (including pasture)	11,118	12,825	
Labour cost	5,454	6,167	
Overhead cost (depreciation and interest)	4,042	7,100	
Other costs (marketing, milkhouse supplies, etc.)	5,830	8,153	
Total Costs	26,444	34,245	
Net amount left for profit and management after charging custom rate per hour for dairy labour	4,985	2,628	
<u>Milk Costs Per Hundredweight Basis</u>			
Feed (including all purchased and home grown and pasture charge)	2.23	2.31	
Labour (dairy share of total farm labour)	1.10	1.11	
Overhead cost (depreciation and interest)	0.81	1.28	
Other costs (marketing, milkhouse supplies, etc.)	1.17	1.47	
Total gross cost per cwt. milk	5.31	6.17	
Credit from herd increase (due to herd growth)	0.80	0.84	
Total net costs per cwt. milk	4.51	5.33	
Average price received per cwt. for all milk sold	5.53	5.76	
Returns to management and profit per cwt. of milk	1.02	0.43	
Net cost per lb. butterfat	1.28	1.53	
Receipts per lb. butterfat	1.56	1.65	
Butterfat test of milk	3.54%	3.49%	

<sup>a/</sup> Credits to dairy herd are value of herd at the end of the year plus sales of cattle, plus cattle butchered, less value of herd at the beginning of the year and less purchase of cattle. They also include milk fed to calves and A.I. rebates.

<sup>b/</sup> Represents wages paid for single and married dairy labour. Where no hired help was employed, operator and family labour was entered at the average rate for hired labour.

## MANAGEMENT

Management is concerned with organizing, planning, directing and supervising a business. Dairy farmers carry out these functions and, in many cases, add their own labour. Over the long term, their decisions are made in reference to two conditions--size and intensity. The wide range in size of Alberta dairy herds has persisted for many years. This has not been so much due to entry of small operators as to the decision of existing operators as to how much responsibility they want to assume as managers. Therefore, no individual operation can be selected out of all farms to be a model for all operations.<sup>1/</sup>

Table 3 has been set up to show average levels in the management factors influencing income in 1968-69 and 1970. The unit factors, per cow, per D.A.U., per hour, per pound and per hundredweight, which measure intensity, are perhaps of more direct interest in individual comparisons for small and intermediate operators, than aggregate factors.

Livestock - Dairy productivity levels were up in 1970 in terms of milk and butterfat, though the average test was down slightly. More roughage and grain were fed per dairy animal unit, but returns per \$100 feed were higher due to greater output per cow.

Crops - The yields of barley, oats and roughage were higher than in 1968-69.

Labour - Total farm operating revenue per man was up, due mostly to the small decrease in man equivalents. The cost of dairy labour per hour rose in 1970. In conjunction with more hours per D.A.U. this tended to reduce the returns to total labour and management to \$2.26 per hour.

Capital - Operating revenue from the total farm per \$1,000 of investment dropped causing a slower capital turnover.

Size of Business - The average acreage per farm land decreased in 1970. On the other hand, the value of the capital assets increased. Herd size was reduced by one cow.

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<sup>1/</sup> Comparisons by size, page 15.



Table 3

MANAGEMENT FACTORS AFFECTING INCOME  
January 1, 1970 to December 31, 1970

Calgary Whole Milk Farms		Group Average 1968-69	Group Average 1970	Your Farm
Number of farms		31	23	
<u>Livestock</u>				
Milk production per cow (including milk fed to calves and for home use)	(lbs.)	10,025	11,298	
Fluid milk sales per farm	(lbs.)	492,862	552,081	
Butterfat per cow	(lbs.)	355	390	
Butterfat test of milk	( % )	3.54	3.49	
Grain & supplement fed per dairy animal unit	(lbs.)	3,591*	4,590	
Roughage per dairy animal unit	(tons)	3.2	3.8	
Returns per \$100 feed fed	( \$ )	264	288	
<u>Crops</u>				
Yield per acre: Barley	(bus.)	44	53	
Oats	(bus.)	68	78	
Wheat	(bus.)	39	36	
Roughage	(tons)	1.3	2.1	
Other Grain	(cwt.)		21	
<u>Labour</u>				
Man equivalent per farm	( no. )	2.12	2.09	
Operating revenue per man	( \$ )	18,182	19,322	
Cost of dairy labour per man hour <sup>a/</sup>	( \$ )	1.48	1.58	
Returns to dairy management and labour per man hour	( \$ )	2.84	2.26	
Labour per pound of butterfat	(hrs.)	0.20	0.20	
Hours labour per 100 pounds of milk produced	(hrs.)	0.71	0.69	
Hours per cow equivalent (total herd)	(hrs.)	52	56	
<u>Capital</u>				
Operating revenue per \$1,000 capital invested	( \$ )	256	224	
Years for operating revenue to equal capital	(yrs.)	3.9	4.5	
<u>Size of Business</u>				
Number of acres owned and rented	(acs.)	648	598	
Number of acres owned	(acs.)	470	409	
Number of cultivated acres (including summerfallow)	(acs.)	410	452	
Capital invested (owned farms)	( \$ )	150,800	180,332	
Number of milk cows (including dry cows)	( no. )	51.6	50.3	
Total dairy animal units (in terms of cow equiv., i.e. one cow equals 1.5 heifers or 3 calves)	( no. )	71.1	69.0	
Number of milk cows as percent of total herd in cow equivalent	( % )	72.5	73.0	

<sup>a/</sup> The average rate for all labour charged to dairy chores. This consisted of single and married wages with board. The operator's labour was charged at the going married labour rate.

\* 1968-69 revision.

# FEED CONSUMPTION AND FEED VALUES

The table below provides some comparative measures between purchased and home grown feed on Calgary study farms for the past three years. During 1970 the farms on study bought 46.8 tons of roughage on the average, for their dairy herds, and used 218.9 tons of home grown roughage. The value of purchased roughage, which consisted of alfalfa - 82% and silage - 18%, averaged \$26.76 per ton. The proportions of all roughage fed were alfalfa - 55%, silage - 19%, native hay - 11% and greenfeed - 15%. More feed was fed per farm than in 1968-69.

In 1970, approximately 44% of the total grain and concentrates fed was purchased. Dairy men used 41% oats, 29% barley and 30% prepared feed and supplement on the average. The values per pound of purchased and home grown grain were slightly below those of 1968-69, at 2.15 and 1.58 cents respectively. The proportion of grain fed to roughage fed was 1 pound to 1.7 pounds. The combination of the 1970 values of purchased feed per farm in the table below amounts to \$4,090.00, which is 36% of total feed costs exclusive of pasture charges.

Table 4      DAIRY LIVESTOCK FEED CONSUMPTION AND FEED VALUES

		Group Average 1967-68	Group Average 1968-69	Group Average 1970
<u>Calgary Whole Milk Farms</u>				
Number of farms		23	31	23
<u>Purchased Roughage Fed</u>				
Average Value per farm	( \$ )	1,932	1,613	1,076
Average tons per farm	( tons )	76.0	63.2	46.8
Value per ton	( \$ )	25.44	25.52	26.76
<u>Home Grown Roughage Fed</u>				
Average value per farm	( \$ )	3,785	3,090	4,786
Average tons per farm	( tons )	185.8	156.5	218.9
Value per ton	( \$ )	20.36	19.74	21.87
<u>Purchased Grain and Other Concentrates Fed</u>				
Average value per farm	( \$ )	2,978	3,020	3,014
Average pounds per farm	( lbs. )	130,056	127,993	139,904
Value per pound	( ¢ )	2.29	2.36	2.15
<u>Home Grown Grains Fed</u>				
Average value per farm	( \$ )	2,523	2,359	2,795
Average pounds per farm	( lbs. )	125,165	127,368	177,277
Value per pound	( ¢ )	2.02	1.85	1.58



# LABOUR

The kind of labour used on dairy farms varies considerably depending on the size of the operation. On the study farms in 1970 the proportion of hired labour time to total labour was 41% in the Calgary group, 51% in the Lethbridge-Medicine Hat group and 34% in the Edmonton group. Respective size in terms of the dairy enterprise investment averaged \$62,351 for Calgary, \$72,894 for Lethbridge and \$54,879 for Edmonton.

The hired labour, however, was supplemented by family labour under varying arrangements in payment or non-payment depending on circumstances. Casual labour was commonly traded between neighbors or paid for as required.

A distribution of labour in the Calgary group of 23 farms shows the type of labour and wages paid including board which was recorded in 1970. These wages represent payment for work of all kinds which occurs on the farm.

## LABOUR RATES

	Hired		Hired		Total	
	Skilled	Labour	Family and	Casual	Months	Hired
	Months	Value	Months	Value		Value
Total	200	\$75,484	37	\$8,963	237	\$84,447
Per Month		337		242		356

For the purpose of attributing a value to all labour on the farm, the farm operators were asked to value their labour at going rates. This was undertaken in order to show its significance in the analysis where returns are attributed to the operator's labour as well as to his equity and his management of the business. In the Calgary study the operator's labour contributions are shown below. Though unpaid family labour did not receive formal wages it was significant in the labour picture. It was evaluated with respect to age and the time involved. The summary is included.

	<u>OPERATOR LABOUR</u>	<u>UNPAID FAMILY LABOUR</u>
Months	271	68
Total Value	\$108,012	\$14,792
Value Per Month	\$ 398	\$ 217

### RETURN TO UNPAID LABOUR, MANAGEMENT AND INVESTMENT

Table 7<sup>1/</sup> provides one of the best means of measuring success between farms by utilizing as a basis the stage where returns apply to the combined items of unpaid labour, management and investment. These components are highly variable between farms, and when the Returns to Management is specified as the single outcome, the importance of the other items is sometimes overlooked. Comparisons, for this purpose, can be made several steps before either Labour Earnings or Return to Management are stated, by using the residual at that point as the return to the business.

In Table 5, this residual was expressed in the return per cow, and averaged \$251.00 per cow for the seventy-six farms in 1970. The farms were arranged in two groups--above and below that level. Forty-three were above, thirty-three were below. The accompanying table shows general similarities and some significant differences in the costs and returns for the two groups.

The table shows both groups chosen on this basis as being close to equal size, in the range of \$32,000 Value of Production, 500,000 pounds of milk production, 11,000 pounds of milk per cow, 45.5 milking cows and \$59,000 of investment in the Dairy Operation. However, differences in costs appear and the results show up as higher levels of returns in all measurements.

Efficiency is often best shown on a unit basis. In the table, a hundredweight of milk produced is the unit and is related to the total value of production, including livestock output as well as milk. The figures on costs per hundredweight bring out the reasons for the better results for the first group. Every item of expense is lower in this group. Reductions in costs appear in feed - \$0.55, other variable expenses - \$0.28, labour - \$0.07, fixed costs - \$0.26, giving a total cost reduction of \$1.16 per hundredweight.

Considering the relatively large number of farms in each group and the nearly equal size of business, it would appear that these per unit comparisons are good indicators of the expenses dairymen might want to watch. While feed

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<sup>1/</sup> Alternative tables, Appendix pages 1 and 2.



Table 5                      RESOURCE COSTS RELATED TO RETURNS TO  
UNPAID LABOUR, MANAGEMENT AND INVESTMENT  
(76 Dairy Enterprises)

		Return to Unpaid Labour, Management & Investment Per Cow	
		<u>Over \$251</u>	<u>Under \$251</u>
Number of Farms		43	33
Milk Sales	( \$ )	27,809	28,119
Total Value of Production	( \$ )	32,668	32,105
Total Cost of Production	( \$ )	26,324	31,587
Return to Unpaid Labour, Mgmt. & Investment	( \$ )	14,215	7,957
Return to Management & Risk	( \$ )	6,344	518
Receipts Per Cwt. Milk Produced	( \$ )	6.41	6.43
Feed Cost Per Cwt.	( \$ )	1.92	2.47
Other Variables Per Cwt.	( \$ )	0.82	1.10
Labour Per Cwt.	( \$ )	1.10	1.17
Fixed Cost Per Cwt.	( \$ )	1.34	1.60
Total Production Costs	( \$ )	5.18	6.34
Return to Unpaid Labour, Mgmt. & Invest.	( \$ )	2.79	1.59
Return to Unpaid Labour & Management	( \$ )	1.99	0.76
Return to Operator's Labour & Management	( \$ )	1.87	0.68
Return to Management & Risk	( \$ )	1.23	0.09
Number of Milk Cows	( no.)	45.0	46.3
Total Milk Production	(lbs.)	509,631	499,061
Production Per Cow	(lbs.)	11,284	10,782
Total Investment	( \$ )	58,466	59,235
Capital Turnover	(yrs.)	1.79	1.85

has the greatest bearing on costs, the table shows that each of the others must be given attention by the operator if he wishes to achieve the largest returns from the dairy enterprise. Though lower feed costs accounted for the greatest single reduction in cost, the table indicates that each of the five played an important part in contributing to higher average returns per hundredweight.

### FACTOR EFFICIENCY AND RESOURCE USE

On page 7 there were a number of management factors listed which represent averages in the levels of resource use and output on the sample dairy farms in 1970. Each of the participating dairymen in his report has his comparable figures beside them to which he may relate his own performance. There are ranges above and below average performance, however, that should be given analysis. This may be done by grouping the farms relative to chosen management factors such as those on the following page.

1. Size may be distinguished physically or financially in respect to either inputs or outputs. Size has been found to have a bearing on success. A large efficient farm may be expected to produce a larger net revenue than a small efficient farm. In regard to a dairy enterprise, the number of cows is a good index of size.

2. Output per cow is a measure of efficiency of herd productivity which should influence the profitability of the enterprise.

3. Sales of milk per \$1,000 of dairy investment shows how well capital is being used and also should be related positively to returns to the operator.

4. Milk production per man equivalent is a measure of labour efficiency.

5. Gross returns over feed fed per cow is a measure of efficiency in the use of feed and normally ought to cause an increase in net returns as the margin increases.

The measurements above are called Efficiency Factors. There are others, but these five are good indicators of success. They have been selected for use in this study.

First, the average levels of performance in the factors was found for the total group of 76 dairy enterprises. The individual enterprises were then divided into above average and below average in reference to the factors. Farms with performance levels which were exactly average were placed alternately in above and below average classifications.

The average factor levels were:

1. The number of cows in the herd . . . . . 45.6 (cows)
2. Sales of milk per cow . . . . . 10,740 (lbs.)
3. Sales of milk per \$1,000 of dairy investment . . . 470 ( \$ )
4. Milk produced per man equivalent . . . . . 415,381 (lbs.)
5. Gross returns over feed cost per cow . . . . . 472 ( \$ )

Table 6 FIVE-FACTOR EFFICIENCY OUTCOMES  
(76 Alberta Dairy Enterprises)

Efficiency Factors	Number of Factors Above Average					
	0	1	2	3	4	5
Number of Enterprises	5	10	16	25	16	4
Number of Cows	28	36	40	40	56	114
Milk Sales Per Cow <sup>1/</sup> (lbs.)	8,808	8,844	10,028	10,439	12,091	12,023
Milk Sales Per \$1000 Investment <sup>1/</sup> ( \$ )	414	351	410	470	522	658
Milk Produced Per Man Equivalent (lbs.)	280,586	335,472	342,502	387,959	506,561	578,237
Gross Returns Over Feed Cost Per Cow ( \$ )	357	376	431	482	520	524

<sup>1/</sup> To fluid milk plants.

Table 6 shows the number of factors above average over each of the five columns, with the highest degree of efficiency related to 5. The number of records associated with each follows, and the factor data is arranged below.

Inspection of the table reveals a clear trend in efficiency in all the items of productivity as one reads from left to right. There were only five instances in the zero class and only four in the class above average in all five factors. The largest group of 25 enterprises was above average in three factors. The table shows that high performance in one aspect of production is not enough and that such performance should be attempted for all factors, in as far as possible, in order to make the best use of resources.



The factor analysis was carried a step further to ascertain that success in an increasing number of factors was, in fact, accompanied by higher net returns.

Table 7 below relates returns to factor performance.

Table 7

FACTOR EFFICIENCY AND RETURNS  
TO THE OPERATOR

(76 Alberta Dairy Enterprises)

<u>Number of Efficiency Factors Above Average</u>	<u>Number of Enterprises</u>	<u>Returns to Unpaid Labour &amp; Management</u>	<u>Operator's Labour Earnings</u>	<u>Returns to Operator's Mgm't &amp; Risk</u>
5	4	\$23,558	\$23,521	\$20,369
4	16	9,002	8,783	5,965
3	25	7,476	6,959	3,571
2	16	6,485	5,430	2,613
1	10	2,262	1,944	-1,153
0	5	1,895	1,590	-1,315

Three stages in returns to the operator were calculated for the 76 dairy enterprises and are set up in the columns as they occurred relative to the five factor performance. Success in the number of factors above average ranges from high to low in the table with the corresponding returns on the same line.

Returns to unpaid labour and management is the net return to the operator and unpaid family labour, Labour Earnings is the return to the operator's labour and management. Returns to the operator's management and risk is the net to the operator after charging his own labour as a cost of operation.

It can be seen that returns in each column range from high to low, corresponding with the standing in efficiency factors. Thus, in regard to the dairy enterprises forming the study, the operators who were above average in an increasing number of efficiency factors received increasingly higher net returns from their businesses.

MILK PRODUCTION	LOW		MEDIUM		HIGH	
	(to 334,999 lbs.)	(335,000 to 659,999 lbs.)	(Over 660,000 lbs.)			
Number of Farms	7	8	8			
<u>Enterprise Receipts</u>						
Livestock Receipts	2921.71	5305.88	7649.29			
Livestock Transferred to Other Enterprises	25.00	648.75	1183.57			
Milk Receipts	15064.28	29280.50	54767.56			
Subsidies and Other Receipts	61.25	123.50	42.86			
Livestock and Produce Used	844.63	1053.25	137.43			
Less Livestock Purchases			5198.14			
Less Livestock Transferred From Other Enterprises	740.00	1426.88	1201.43			
Adjustment for Inventory Change	17967.61	35732.25	59783.99			
Value of Production From Dairy						
<u>Enterprise Costs</u>						
Grain	775.78 cwt.	2436.26 cwt.	3637.92 cwt.			
Supplement	122.00 cwt.	177.25 cwt.	977.29 cwt.			
Complete Feed	462.25 cwt.	264.50 cwt.	961.57 cwt.			
Roughage	119.54 tons	237.88 tons	296.14 tons			
Silage	4.13 tons	12.50 tons	146.86 tons			
Feed Straw	2.19 tons					
Pasture	165.00 AUM	414.13 AUM	282.29 AUM			
Mineral, Salt, Etc.						
Total Feed	6197.80	12108.80	21217.10			
Bedding Straw	165.00	471.25	645.71			
Veterinary and Medicine	308.41	538.63	1061.57			
Other Direct Variable Costs	1656.01	3026.75	5692.00			
Allocated Variable Costs	1148.75	1992.25	3320.28			
Total Variable Costs (Excluding Labour)	9475.96	18137.67	31936.66			
Hired Labour	327.75	1885.88	6181.43			
Family Labour	464.38	403.75	274.29			
Operator Labour	2725.88	2968.75	3778.14			
Total Labour	2428.88 hrs.	3779.88 hrs.	5700.71 hrs.			
Utilities and Overhead Costs	3518.00	5258.38	10233.85			
Depreciation Charges	749.00	1018.00	3413.29			
Interest--Buildings and Site (7%)	1373.63	2431.13	4639.57			
Interest--Machinery and Equipment (7%)	777.97	1379.37	1867.28			
Interest--Feed and Supplies (7%)	456.94	705.17	1110.50			
Interest--Livestock and Quota (7%)	30.63	36.71	51.95			
Total Production Cost	1123.25	2050.30	3813.52			
Return Over Variable Costs	17505.38	31016.70	57066.61			
Return to Unpaid Labour, Investment and Management	8491.65	17594.58	27847.32			
	6041.27	12259.58	13613.04			

Difference in sizes of dairy enterprises are important to the farmers who operate within them. The table above was arranged to assist dairymen to associate their particular size of operation with one of the three above and to be enabled to examine their own in closer reference than could be possible with an all-farms average. The basis of grouping was by volume of milk production, the total number of enterprises being arranged in order of size and divided into thirds. This procedure was also followed in 1968-69 and thus, some comparability is also possible with that year.

Table 9

REGIONAL ENTERPRISE COST COMPARISONS

	Edmonton Group Average 1970	Calgary Group Average 1970	Lethbridge Group Average 1970	All Areas Group Average 1970
Number of farms	46	23	7	76
<u>Dairy Receipts Per Farm</u>				
Value of milk sales	\$23,974	\$32,018	\$40,401	\$27,921
Value of milk used in house	118	106	168	119
Value of credit to dairy herd	3,756	4,662	5,839	4,222
Value of miscellaneous dairy income	223	87	0	161
Total Receipts	\$28,071	\$36,873	\$46,408	\$32,423
<u>Dairy Costs Per Farm</u>				
Feed cost at farm market value (including pasture)	\$ 9,227	\$12,825	\$15,433	\$10,887
Labour cost	5,246	6,167	7,157	5,701
Depreciation and interest cost	5,758	7,100	7,349	6,311
Other Costs	4,312	8,153	6,873	5,710
Total Costs	\$24,543	\$34,245	\$36,812	\$28,609
Return to Management	3,528	2,628	9,596	3,814
<u>Milk Costs Per Hundredweight Basis</u>				
Feed (purchased, home grown and pasture charge)	\$ 2.17	\$ 2.31	\$ 2.07	\$ 2.21
Labour (dairy share)	1.24	1.11	0.96	1.15
Depreciation and interest	1.36	1.28	0.98	1.28
Other costs	1.02	1.47	0.92	1.16
Gross cost per cwt. of milk	\$ 5.79	\$ 6.17	\$ 4.93	\$ 5.80
Less credit from herd growth	0.89	0.84	0.78	0.86
Net cost per cwt. of milk	\$ 4.90	\$ 5.33	\$ 4.15	\$ 4.94
Average price received per cwt. for all milk sold	\$ 5.69	\$ 5.76	\$ 5.35	\$ 5.69
Return to management	0.79	0.43	1.20	0.75
Net cost per lb. butterfat	\$ 1.40	\$ 1.53	\$ 1.19	\$ 1.41
Receipts per lb. butterfat	1.62	1.65	1.53	1.63
Butterfat test of milk	3.51%	3.49%	3.49%	3.50%

The table above reproduces the Calgary Dairy Enterprise Cost Analysis from page 5, along with the corresponding tables from the Edmonton and Lethbridge reports. A consolidation of these which include all study farms is shown in the right-hand column.



## A P P E N D I X



Table 1 CHARACTERISTICS OF DAIRY ENTERPRISES CLASSIFIED BY  
FEED COSTS PER COW AND INVESTMENT PER COW

1970

		Alberta Cost of Feed <sup>1/</sup>		Alberta Investment <sup>2/</sup>	
		Per Cow		Per Cow	
		Over \$238	Under \$238	Over \$1,287	Under \$1,287
Number of Farms		35	41	39	37
1. Milk Sales	( \$ )	27,196	28,623	25,704	30,271
2. Total Value of Production	( \$ )	31,517	33,173	30,264	34,594
3. Total Cost of Production	( \$ )	30,909	26,591	28,129	29,096
4. Return to Op. Labour & Mgmt.	( \$ )	3,873	9,484	5,304	8,449
5. Return to Management & Risk	( \$ )	608	6,582	2,135	5,498
6. Receipts/Cwt. Milk Produced	( \$ )	6.50	6.33	6.55	6.29
7. Feed Cost Per Cwt.	( \$ )	2.56	1.81	2.28	2.03
8. Other Variables Per Cwt.	( \$ )	1.06	0.84	0.96	0.92
9. Labour Per Cwt.	( \$ )	1.17	1.10	1.19	1.08
10. Fixed Cost Per Cwt.	( \$ )	1.59	1.33	1.66	1.28
11. Total Production Costs	( \$ )	6.38	5.08	6.09	5.31
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	( \$ )	1.74	2.69	2.21	2.31
13. Unpaid Labour & Management	( \$ )	0.90	1.90	1.25	1.61
14. Operator's Labour & Management	( \$ )	0.80	1.81	1.15	1.52
15. Management & Risk	( \$ )	0.12	1.25	0.46	0.98
16. Number of Cows	( no. )	44.8	46.2	41.6	49.6
17. Total Milk Production	( lbs. )	484,635	523,882	461,982	550,330
18. Production Per Cow	( lbs. )	10,825	11,324	11,097	11,094
19. Dairy Investment	( \$ )	58,499	59,075	63,886	53,589
20. Capital Turnover	( yrs. )	1.86	1.78	2.11	1.55

<sup>1/</sup> Feed cost per cow, above or below the average of \$238.00, is the main determinant in the results listed in columns 1 and 2.

<sup>2/</sup> Dairy investment, above or below the average of \$1,287.00 per cow, is the controlling factor in the results obtained in the third and fourth columns.





Table 2      CHARACTERISTICS OF DAIRY ENTERPRISES CLASSIFIED BY  
THE GROSS VALUE OF PRODUCTION PER COW AND THE NUMBER OF HOURS OF LABOUR  
PER HUNDREDWEIGHT OF MILK

1970

		Alberta Gross Value <sup>1/</sup> of Production Per Cow		Alberta Hours of Labour <sup>2/</sup>	
		Over \$710	Under \$710	Over .72 Hrs./Cwt.	Under .72 Hrs./Cwt.
Number of Farms		38	38	39	37
1. Milk Sales	( \$ )	33,960	21,928	21,195	35,056
2. Total Value of Production	( \$ )	39,719	25,127	25,187	40,050
3. Total Cost of Production	( \$ )	33,754	23,464	23,184	34,328
4. Return to Op. Labour & Mgmt.	( \$ )	9,165	4,954	5,251	8,596
5. Return to Management & Risk	( \$ )	5,965	1,663	2,003	5,722
6. Receipts Per Cwt. Milk Produced	( \$ )	6.46	6.36	6.56	6.33
7. Feed Cost Per Cwt.	( \$ )	2.08	2.27	2.16	2.15
8. Other Variables Per Cwt.	( \$ )	0.93	0.95	0.95	0.92
9. Labour Per Cwt.	( \$ )	1.08	1.20	(.97 hr) 1.40	(.56 hr) 0.96
10. Fixed Cost Per Cwt.	( \$ )	1.40	1.53	1.52	1.38
11. Total Production Costs	( \$ )	5.49	5.94	6.03	5.41
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	( \$ )	2.33	2.20	2.42	2.18
13. Unpaid Labour & Management	( \$ )	1.56	1.31	1.54	1.41
14. Operator's Labour & Management	( \$ )	1.49	1.16	1.37	1.37
15. Management & Risk	( \$ )	0.97	0.42	0.52	0.92
16. Number of Cows	( no.)	50.0	42.0	36.3	55.5
17. Total Milk Production	(lbs.)	615,192	394,890	383,966	632,660
18. Production Per Cow	(lbs.)	12,272	9,585	10,582	11,388
19. Dairy Investment	( \$ )	67,663	49,937	48,426	69,734
20. Capital Turnover	(yrs.)	1.70	1.99	1.92	1.74

<sup>1/</sup> Productivity per cow, above or below the average of \$710, is the major factor identified with items in the first two columns.

<sup>2/</sup> The labour time, above or below the average of .72 hours per hundredweight, is the controlling factor in the items in the third and fourth columns.















